

----- the newsletter of the Sinclair Computer Users Society -----

**SINCUS NEWS**

1229 Rhodes Road  
Johnson City, New York 13790

----- since 1982 -----

**MAY MEET- ELECTIONS** \* come on in and vote \* May 25 7pm Vestal Library  
Candidates are: Clyde Tackley for President, Dave Schoenwetter for Vice-President, George Penny for Treasurer, Paul Hill for Secretary and Don Lamem, William Tilley, Carl Morris and Scott Eddy for three Trustee positions. Our charter will be up for review and discussion.

\*\* Computer Chronicles Saturday 8:30am, WSKG-TV Binghamton

**OWEGO HAMFEST**- Saturday May 7, 8am to 4pm. \$4 General admission Flea market, computer seminar, door prizes, at the Treadway Inn, Owego NY.

Locally a confederation of computer user groups has been formed, and we are looking into joining. Nationally a North American TS user association has been proposed and info has been received; objective is to provide a forum for exchange of ideas, a source of info, such as active members, User Groups, Sinclair BBSs, a library of PD software, and a listing of available share/free ware. Later on they want to propose industry wide standards on hard/soft ware compatiability. SNUG( Sinclair Northamerican Users Group ) would be in effect an umbrella group to all user groups. Right now this is an idea, if you have anything to suggest, contact;  
Mel Nathanson, 7515 Arbordale Dr., Port Richey, FL 34668 (813)863-5552

**March meet:** At the meeting, Dave Schoenwetter presiding, 9 attending, the SINCUS owned disc drive system was unveiled. At the Feb meet a proposal to provided the newsletter editor with a seperate group owned computer system was passed. The choice of systems and purchases was left to the editor. Details on the decision and equipment to follow in this letter. A former member and treasurer, Glenn Wilson sent a box of four computers, ZX81s and TS1000s, and an EPROM burner, the Sinclair ZX Printer and a 16K RAM pack. Several items will be sold or donated as per upcoming resolutions. The editor will attempt to create a "portable" 2068 system with two drives, monitor, tape, modem and printer, to enable the ease and safe transport of the system to and from meetings.  
Bill Tilley is home from Wilson Hospital recouping from a mild heart problem, Get well soon Bill, be good to see you at the meets.

**April Meet:** Dave Schoenwetter presiding, 8 attending. After the secteraries' reports, the nominations for club officers for 1988-1989 were opened. We will be voting on our choice for Trustee with four candidates for three offices. Updating of the charter is on the May agenda, with regard to financial procedures and handling of club property. The question of disposal or sale of the donated material from the March meet was settled, all donated material will be loaned out to those who wish to use them. Donation of a computer to a youth group in Poland was turned down due to several technical difficulties. Don Lamem will swap his TS2040 for the Sinclair Printer. John Colonna gave an interesting talk on Vu-Calc, and with several copies of printouts made a walk thru demo of some simple projects one can do with his program and computer. Group buy of 5.25" DSDD discs at \$.33 per has been made, limited amounts available to members, at cost. C20 computer tapes available at \$.80 per, no case, no lable. Purchases by mail, pay by check, add \$3 s&h per 10 units ordered, order care of this newsletter. Tape/disc swap #104 is just about finished, contact John Colonna, 20 Guilfoyle Ave., Binghamton, NY 13903, with a SASE.

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In the last issue I tried to make the best of a poor situation with the printing results on the Spectrum ROM-2068 Address Atlas, by including a correction slip with each copy. However the correction slip had a new goof in it: It has under Label, "K-DUMP", should be 'DUMPPR'. Sorry about that.

#### RANDOM BITS

In the last newsletter I wrote of the January meet: "A video provided by Don Lamen of the Northwest Computer Fest of 1987 was viewed in part. More will be shown at upcoming meets, to borrow this VHS tape contact Don." I was taken to task by the vendor of the tape RMG of Oregon City, OR because this is a copyrighted video, and that if anyone wants to see the tape, BUY one from RMG. My apologies, I did not know this was copyrighted material and I gave no thought to the possibility of someone with two VCRs making a illegal copy. Do NOT contact Don about borrowing his tape.

We recently got a newsletter from the TS section of the Boston Computer Society, first in a few years. Noted that Bob Dyl is back in business at his old address but with a new business name. For the members who were stuck with unfilled orders from Bob, maybe now is the time to contact him. Any results will be published.

It has come to our attention, thru many sources, that E. Arthur Brown is no longer in the T/S business. Just not enough business to warrant advertising. It is too bad, they were an excellent vendor to do business with. And while we are at it, Weymil Corporation, Bellingham, WA is no longer selling TS supplies. A report in the April 1988 issue of the "Hacker" from the TSUG of Las Vegas, and echoed in the Ottawa Newsletter, "Knighed Computers' has sent out another flyer stating that they are NOT going to be carrying any new T/S products, they will just be sticking with their old line at reduced prices." I read this with some dismay, and then while ordering some software from Ray Payne, co-owner of Knighed Computers, asked him about this. (April 14, 1988) Ray had not heard of this flyer, and had not even thought of quitting the TS 2068 line, and it is their intention to stay in the TS2068 line.

Be informed that Knighed Computers, 10 Canalview Mall, Fulton, NY 13069 (315) 593-8219 is still in business and is NOT making any plans to abandon its customers.

In light of a number of reports of vendors leaving the TS scene, it is strongly suggested that prior to mailing off your hardearned bucks, call or write to verify the vendor's status.

A new TS Vendor: T & C Services, 20 Liberty Terrace, Buffalo, NY 14215 (716) 834-1716 has a free catalog of 1000 and 2068 software.

Hello and Welcome to SINCUS NEWS to: Bill Jones, Panama City, FL; and a BIG thank you to the renewing members, Nyles Cohen, New York, NY; Joan Kealy, El Paso, TX; Larry Anderson, Davenport, IA and Dan Pinko, Parksville, BC Canada.

SINCUS goes Oliger! At the meet in February, a resolution was passed for the purchase of a disc interface, power supply and material to start a society owned 2068 system for the production of newsletters, demos at meets and maintainance of records. Dave donated two drives, and Carl Morris donated a spare 2068, books and software. The decision of what to purchase was left to me, the editor. After checking with the only two disc system owners currently active in the group, Clyde Tackley and John Colonna, I decided to go with the Oliger interface over the other choice, Larken. Aerco was too expensive and not considered. John and Clyde both had Oliger systems and were very pleased with them. For the reason of local support of compatible systems I decided to go with Oliger. I checked thru Computer Shopper and found a disc drive cabinet and power supply for 2 full height 5.25" drives from IB Computers, 1519 S.W. Marlow, Portland OR for \$69.95. I got the "discworks" from Oliger, the expansion board, "A" and "B" boards and cable, assembled and tested. Everything arrived within a couple weeks, and only the power supply transformer had to be bolted down, all else fine. After getting some disks and with Clyde's help got a drive up and working with no problems. The NMI "snapshot" button worked like gangbusters! All in all, everyone in the group should be pleased with the system! After using the disc system for a couple weeks I dread the thought of using the tape recorder! How spoiled am I.

NOTE to modem users: a number of BBSs are supporting a petition drive of modem users on the FCC's proposed TAX on modem use on telephone lines. UPDATE: I have received a pile of paper from the local US Congress Rep. Matt McHugh, Ithaca, NY, it is a lot of reading, and difficult at best to comprehend the whys and wherefores. But, proposal was dropped in Feb 88. Apparently due to some 10,000 letters from modem users! Info from the Wall Street Journal, Mar 17 88, via the RAMTOP newsletter is that the FCC has decided to scrap its proposal to increase the telephone rates for computer users. However the last paragraph says that the FCC would proceed with a new proposal to charge access fees of about \$4.50 per hour per user to hookup private telephone networks to local telephone systems. [Election year governmental functionaries strike again.]

\* ed. comment

Feb-March issue of LISTing has many interesting bits of news and TS History abound. LIST, 5 Peri Lane, Valley Stream,



NY 11581. An EAST coast TS FEST? Could be-still in the what if, might be, any suggestions? and any volunteers?-stage. Outside of the very first T/S computer fest, the Boston Computer Society's TS Section birthday party back in 1983, must be us east coasters are all partied out. Well, we will see. As for the history, Billy Skyrme visited a LIST meet, and left a lot of tidbits of TS history behind. The TS 3068 with 1meg RAM, 256 colors, and HiRez Graphics, TS Expansion Bus, 3.5" drives for less than \$50, were in the future. The current situation is due to timing, lack of profit and computer wars.

## ZX81/TS1000 Tips-by Don Lamen, SINCUS

5. A machine code routine that allows you to insert a BASIC line at any unused line number. If by chance you pick a line number that is already in use the routine returns a report code "U". The routine may be relocated by changing the addresses, relative to the three STORE locations and the B\_LINE address, to the appropriate addresses.

4082	0000	STORES: STORE 1	4088	0083	B_LINE: LINE # 131
4084	0000	STORE 2	0200		LINE LENGTH; 2
4086	0000	STORE 3	E3		STOP
			76		N/L

6 bytes

6 bytes

ENTRY POINT:  
(16525)d

408E	CD230F	BAS_IN: CALL OF23, FAST	40BA	228640	STOR: LD(STORE 3), HL
D9		EXX	EB		EX DE, HL
228240		LD(STORE 1), HL'	CD9E09		CALL 099E, MAKE_ROOM
D9		EXX	A7		AND A
010600		LD BC, 0006	ED52		SBC HL, DE
C5		PUSH BC	19		ADD HL, DE
2A0C40		LD HL, (D.FILE)	3801		JR C, 40BA, STOR
09		ADD HL, BC	09		ADD HL, BC
228440		LD(STORE 2), HL	D1		POP DE; DESTINATION
408300		LD HL, 0083; NEW LINE #	C1		POP BC; NO. OF BYTES
CDD809		CALL 09DB, LINE_ADDR.	218840		LD HL, 4088; SOURCE
2003		JR NZ, 40AC, N_OK	EDB0		LDIR; MOVE IN B_LINE
C1		POP BC	D9	RESTOR: EXX	
CF1D		RST 08 DEFB: "U"	2A8440		LD(STORE 2)
40AC	C1	N-OK: POP BC	220C40		LD (D.FILE), HL
C5		PUSH BC	2A8640		LD HL, (STORE 3)
E5		PUSH HL	222940		LD(NXTLIN), HL
EB		EX DE, HL	40D9		CALL OF2B, SLOW
2A2940		LD HL, (NXTLIN)	C9		RET

91 bytes total

6. A short routine to delete one or more lines of BASIC from your machine code. To delete a single line, use the line # both as the 1st. line and the last line to be deleted. This routine is completely relocatable.

(16514)d

Lines 920 and 950 are for example.

4082	219803	DELETE: LD HL, 0398; Line 920 1st line.	CDF209	CALL 09F2, NEXT_ONE
CDD809		CALL 09DB, LINE_ADDR.	EB	EX DE, HL
E5		PUSH HL	D1	POP DE
21B603		LD HL, 03B6; Line 950 last line.	CD5D0A	CALL 0A5D, RECLAIM_1
CDD809		CALL 09DB, LINE_ADDR.	C9	RET

## CROSS REFERENCE TABLES TS2068 TO SPECTRUM

by N.A. PASHTOON, AUG 1984

In the following tables the routines in TS 2068 are provided in alphabetical order, as supplied in the TS2068 Technical Manual. The Address for the corresponding Spectrum routine is then provided. Thus if you are in possession of the TS2068 disassembly, you may check the following cross reference tables, you will obtain the address of the Spectrum routine. Then you can consult your copy of Logan and O'Hara's Spectrum ROM Disassembly, and obtain the necessary information for programming your TS2068 properly. N.A. Pashtoon

continued on following pages

A COMPARATIVE ROM ATLAS-  
FROM SPECTRUM TO TS2068

The Abandonment of the computer scene by the Timex Corp. have caused us, the users, to fall on hard days because of lack of software and hardware support. The only avenue of support for our computers is either through conversion of Spectrum software, or through the use of the Spectrum emulator in conjunction with the TS2068.

In order to facilitate the software conversion process, it is essential to be equipped with an atlas of the memory maps, establishing the correspondence of addresses between the two computers. Such an atlas should also benefit MC programmers in effectively utilizing the ROM routines. Finally, it is hoped that the Atlas will help all the PEEKers, the curious, and the explorers of TS-Land in using the supplied addresses as beacons to find their path in the ROM maze.

The organization of the Atlas is based on ascending addresses of the Spectrum ROM. The labels and names are those used by Ian Logan and Frank O'Hara in their excellent book, "The Complete Spectrum ROM Disassembly", available from Melbourne House and Zebra Systems. As such, the book is indispensable for the purpose of efficient MC programming and for software conversion.

The Atlas then provides the corresponding ROM addresses for the TS2068, and all the names and labels I could find in Corcoran and Branigin's "Timex 2068 Technical Manual".

To obtain the disassembly of the TS2068 16K Home ROM as well as the 8K Extension ROM (EXROM), one needs a good disassembler. Ray Kingsley's HOT Z-2068 assembler-disassembler is very highly recommended (see SYNTAX May issue). The HOT Z has a large NAMES file which can be loaded with the program, providing subroutine names and some labels for the disassembly. The HOT

Z self starts in the disassembly mode, displaying the 16k Home ROM from address 0000H.

The 8K EXROM overlays the first 8K chunk of the 16K Home ROM. In order to either disassemble or use the routines in the EXROM the bank-switching logic should be activated, the desired task performed, and then the EXPROM is to de-activated.

To illustrate, in the following example the content of the EXROM is copied to the RAM starting at location 8000H, where it can be disassembled and displayed.

```
DI                LD BC,2000
LD A,01           LDIR
OUT (F4),A       XOR A
IN A,(FF)        OUT (FF), A
SET 7,A          OUT (F4),A
OUT (FF),A       EI
LD HL,0000       RET
LD DE,8000
```

The use of the EXROM subroutines is illustrated in the next example. The routine is for reading the "header" on TS2068 tapes. The "header" constitutes of 17 bytes of information on program name, whether it is Basic, MC, Data, etc., and whether it is auto-starting and from what line, the # of bytes, etc. (See chart on P. 112 of TS Tech. Manual). The routine jumps to the EXROM, and uses the R-TAPE subroutine at 00FCH. The 17 bytes of "header" information is stored in the RAM starting at location 8000H.

```
SCF              LD, A,01
LD A,00          OUT (F4),A
LD IX,8000       POP AF
LD DE,0011       CALL R-TAPE
DI              LD A,(5C81)
PUSH AF         OUT (F4),A
IN A,(FF)       IN A,(FF)
SET 7,A         RES 7,A
OUT (FF),A      OUT (FF),A
IN A,(F4)       EI
LD (5C81),A     RET
```

The use of the above routine with a suitable Basic program, greatly facilitates the conversion pro-

CROSS REFERENCE TABLES. TS2068 to SPECTRUM

LOAD MAP MODULE	ORIGIN	LENGTH	DATA	1E82	SYNTAX	1E27
BLOCK	0000	0000	DEF	201D	SYNTAX	1F60
BASIC	0000	0227	DELREC	1750	LIST	19E8
KSCAN	0227	02D9	DELSYM	0870. 0B7E	IO_2	015
IO_1	0500	0502	DEL_DE	174D	LIST	19E5
IO_2	0A02	031B	DEL_K	0BFD E	IO_2	1097
EDIT	0D1D	0682	DESLUG	0D0D	IO_2	11A7
CHANS	139F	0142	DE_HL	1668	LIST	191C
LIST	14E1	02D4	DIGIT?	30D9	INOUT	2D1B
AROS	17B5	0190	DIM	2FC0	IDENT	2C02
SYNTAX	1945	080A	DIVIDE	356E	SUMS	31AF
SYNTWO	214F	04B4	DRAW	26DB	GRAPHS	2382
GRAPHS	2603	0251	DRAWLN	2813	GRAPHS	24BA
EXPRN	2854	041C	DRAW_LL	2910	GRAPHS	24B7
IDENT	2C70	03E9	DUMPPR	0A23	IO_2	0ECD
INOUT	3059	0301	DYADIC	1BDC	SYNTAX	1C79
SLIMS	335A	032A	ECHO	0C83	IO_2	111D
CALC	3684	0437	EDIT_K	0A82	IO_2	0F2C
FUNCTS	3ABB	01CE	END?	1B44	SYNTAX	1BEE
TAPMSG	3C89	0053	ENDSTT	1AB9	SYNTAX	1B76
CH_SET	3D00	0300	ENDTEM	1B4A	SYNTAX	1BF4
			ERASE	25D4	SYNTWO	1793
			ERR2	1B91	SYNTAX	1C2E
			ERR4	1FCF	SYNTAX	1E15
			ERR5	07C1	IO_1	0C86
			ERR6	356C	SUMS	31AD
			ERRB	1F29	SYNTAX	1E9F
			ERRH	237E	SYNTWO	21D4
			ERRR	123D	EDIT	160E
			EXCUTE	1AD8	SYNTAX	1B8A
			EXP	3ADF	FUNCTS	36C4
			EXPRN	2854	EXPRN	24FB
			FIND_LL	16D6	LIST	196E
			FIND_N	2C70	IDENT	28B2
			FIX_U	1F23	SYNTAX	1E99
			FIX_U1	1F1E	SYNTAX	1E94
			FLASHA	160D	LIST	18C1
			FLOAT	3656	SUMS	3297
			FOR	1C78	SYNTAX	1D03
			FORMAT	25CC	SYNTWO	1793
			FP2A	3193	INOUT	2DD5
			FP2BC	3160	INOUT	2DA2
			F_ATTR	28D7	EXPRN	2580
			F_INKY	29F2	EXPRN	2634
			F_PI	29E5	EXPRN	2627
			F_PNT	2624	GRAPHS	22CB
			F_SCRN	288E	EXPRN	2535
			GETAL	17CF	AROS	
			GET_EL	2D54	IDENT	2996
			GET_LN	1324	EDIT	1695
			GET_XY	2660	GRAPHS	2307
			GO_SUB	1F99	SYNTAX	1EED
			GR_COL	238C	SYNTWO	21E2
			HIFLSH	241D	SYNTWO	2273
			INCH	11E1	EDIT	15E6
			ININT	30F9	INOUT	2D3B
			INIT	0D31	EDIT	11CB
			INPUT	222B	SYNTWO	2089-20
			INSI	12B8	EDIT	1652
			INSA	0AE7	IO_2	0F81
			INSERT	12B7	EDIT	1655
			INT	3ACA	FUNCTS	36AF
			INTDIV	3ABB	FUNCTS	36A0

GLOBAL	ADDRESS	MODULE	Specy addr.
ACS	3C5E	FUNCTS	
ADD	33D3	SUMS	3014
ALNUM?	3046	IDENT	2C88
ALPHA?	304B	IDENT	2C8D
ANGLE	3B9E	FUNCTS	3783
AROS	18C6	AROS	
ARRAY	37C5	CALC	3A06
AR_LL	17EA	AROS	
AR_NXT	17FF	AROS	
ASN	3C4E	FUNCTS	3833
ATN	3BFD	FUNCTS	37E2
ATTBYT	0710	IO_1	0BDB
BEEP	0436	KSCAN	0BF8
BORDER	243E	SYNTWO	2294
BREAK?	2009	SYNTAX	1F54
CAT	25C8	SYNTWO	1793
CHCODE	0371	KSCAN	0333
CHINIT	11AA	EDIT	15AF
CHK_SZ	1FBB	SYNTAX	1F05
CIRCLE	2679	GRAPHS	2320
CLCHAN	13BE	CHANS	1701
CLEAR	1F36	SYNTAX	1EAC
CLEL	133F	EDIT	16B0
CLLHS	08A9	IO_1	0D6E
CLOSE	139F	CHANS	16E5
CLPR	0A35	IO_2	0EDF
CLR_BC	1F39	SYNTAX	1EAF
CLS	08EA	IO_1	0DAF
CLS_B	097F	IO_1	0E44
COLITM	23A6	SYNTWO	21FC
COLOUR	23DE	SYNTWO	2234
CONT	1EE4	SYNTAX	1E5F
COS	3BC5	FUNCTS	37AA
CP_BC	16E8	LIST	1980
CTRO	371A	CALC	335B



INTPT?	2889	EXPRN	2530	F_RT	0554	IO_1	0A3D
IN_K	0C0E	IO_2	10AB	P_SEQ	217E	SYNTWO	1FDF
I_SEQ	226B	SYNTWO	20C1	RAMNO	377F	CALC	33C0
JUMP	1EF1	SYNTAX	1E62	RAND	1ED4	SYNTAX	1E4F
K_BASE	035C	KSCAN	021E	RDCH	11CF	EDIT	15D4
K_CLS	08A6	IO_1	0D6B	READ	1D96	SYNTAX	1DEC
K_DUMP	0A02	IO_2	0EAC	RECLN	1720	LIST	19B0
K_LIST	1545	LIST	17F9	REMGSZ	12CA	EDIT	1064
K_LLST	1541	LIST	17F5	RESET	1354	EDIT	16C5
K_LPR	2155	SYNTWO	1FC9	RESTBC	1ECA	SYNTAX	1E45
K_NEW	0D1D	EDIT	11B7	RETURN	1FD4	SYNTAX	1F23
K_PRIN	2159	SYNTWO	1PCD	RND	29B6	EXPRN	25F8
K_SCAN	02B0	KSCAN	02BE	ROOM?	3768	CALC	33A9
LCU2	132D	EDIT	169E	ROOT	3C65	FUNCTS	384A
LDDE	313D	INOUT	2D7F	RSET	2454	SYNTWO	—
LDMES	3CA8	TAPEMSG	—	RSTSTR	13A8	CHANS	16EB
LDTVCU	061A	IO_1	0B03	R_ATTS	0888	IO_1	0D4D
LE3	0055	BASIC	0055	SCRL	0939	IO_1	0DFE
LED18	0E2F	EDIT	12A9	SCRMBL	2603	GRAPHS	22AA
LED4	0E8D	EDIT	1303?	SEARCH	136B	EDIT	16DC
LET	2EBD	IDENT	2AFF	SELECT	1230	EDIT	1601
LINENO	1768	LIST	19BF	SEL_HL	1248	EDIT	1615
LIST	14E1	LIST	1795	SENDCH	11ED	EDIT	15F2
LN	3B2E	FUNCTS	3713	SENDTV	0500	IO_1	09FA
LPO	15AC	LIST	1060	SEPRMT	3C89	TAPEMSG	—
LS4	1A44	SYNTAX	1B28	SETCUR	0914	IO_1	0DD9
LT22	1BBC	SYNTAX	1C59	SETTVC	0914	IO_1	0DD9
MOVE	25D0	SYNTWO	1793	SET_AT	05B2	IO_1	0A9B
MULT	3468	SUMS	30A9	SHIFT	339C	SUMS	2FDD
NC_HL	0077	BASIC	0077	SIN	3BD0	FUNCTS	37B5
NEGATE	382D	CALC	346E	SKIP	1D28	SYNTAX	1D86
NEW	0D7F	EDIT	1219	SKIPIT	2569	SYNTWO	—
NEWDEV	24D2	SYNTWO	—	SLICER	2E10	IDENT	2A52
NEXT	1D55	SYNTAX	1DAB	SMINIT	11C1	EDIT	15C6
NEXTCH	0074	BASIC	0074	SOUND	2128	SYNTAX	—
NEXT_L	165B	LIST	190F	SRCHSC	1374	EDIT	—
NOTKB?	2380	SYNTWO	21D6	STBOOL	3926	CALC	350B
NXT_HL	2C69	EXPRN	2BAB	STDE_S	314C	INOUT	2DBE
OPCHAN	1465	CHANS	175D	STDE_U	314A	INOUT	2DBC
OPEN	142A	CHANS	173C	STKUSN	3059	INOUT	2C9B
OPTNO	1C49	SYNTAX	1CDE	STK_0	1C51	SYNTAX	1CE6
OUTPUT	31A1	INOUT	2DE3	STK_A	30E6	INOUT	2D28
PAEDCB	2E74	IDENT	2AB6	STK_BC	30E9	INOUT	2D2B
PARP	03F3	KSCAN	0385	STK_M	3773	CALC	33BA
PASSEM	25B9	SYNTWO	—	STOP	1C59	SYNTAX	1CEE
PAUSE	1FEF	SYNTAX	1F3A	STRITO	220F	SYNTWO	2070
PHLAF	004F	BASIC	?	STTVCU	05F3	IO_1	0ADC
PLOT	2635	GRAPHS	22DC	SUB	33CE	SUMS	300F
PLOTBC	263E	GRAPHS	22E5	SUBLIN	16F0	LIST	1988
PLUGIN	0000	BASIC	0000	SUBLN1	16F3	LIST	198B
POPSTR	2FAF	IDENT	2BFI	SUMSLD	3379	SUMS	2FBA
PRSCAN	0A4A	IO_2	0EFA	SYNERR	1BED	SYNTAX	1C8A
PR_CUR	162D	LIST	18E1	SYNTAX	1A27	SYNTAX	1B17
PR_TV2	0776	IO_1	0C3B	TAN	3BF5	FUNCTS	37DA
PSHSTR	2E70	IDENT	2AB2	TC_HL	0078	BASIC	0078
PUT	15C9	LIST	187D	TEM1	1B82	SYNTAX	1C1F
PUTDIG	11EA	EDIT	15EF	TEM10	1BEF	SYNTAX	1C8C
PUTMES	073F	IO_1	0C0A	TEM6	1BE5	SYNTAX	1C82
PUT_BC	1788	LIST	1A1B	TEMP38	19E0	SYNTAX	1ADF
PUT_LN	1795	LIST	1A28	TEMP39	19E1	SYNTAX	1AEP
PUT_SR	15A1	LIST	1B55	TERM?	21E7	SYNTWO	2048
P_LFT	053A	IO_1	0A23	TEST0	3904	CALC	34E9
P_NL	0566	IO_1	0A4F	TIMES	3489	SUMS	30CA

PRINTER PROGRAMMING

- OR -

Adapting Software to Printers

The article about printer control in the October Issue brought forth enough response to indicate that a more comprehensive reference should be attempted. Apparently many users are having problems in this area. One nice Lady wrote her thanks, and several Gents wanted more information. But John Olliger wrote and pointed out a couple of mistakes. These will be corrected in the text of the following.

Why doesn't software writers include enough programming to make the software print "right out of the box" with ALL TYPES of printers? Well, that would be nice, but would likely require about 38K of programming, and our TS-2068 has only 38K of FREE memory to start with. So, usually a software is designed to print with a type of printer that is "compatible with" several brands, and instructions given to make program line changes to adapt to other printers. There are several DOT MATRIX printer brands that use the "EPSON STANDARD", which usually means that the printer maker copied the Epson "Control Codes". Two "Standards" widely used with Daisy Wheel printers are "QUEME Compatible" and "DIABLO Compatible".

In order for a computer to communicate with a printer, both devices must understand a common language. That common language is called ASCII (American Standard Code for Information Interchange). Page number 239 of the TS-2068 User manual gives the ASCII Codes and calls them "The Character Set". Actually there are more codes in ASCII than the TS-2068 uses, and a few of the codes in the TS-2068 CHR SET are not standard ASCII, but for printer control, the codes in the User Manual will suffice.

So, we have the "common language", which is ASCII. The computer understands it and so does the printer. Now there are two jobs that the printer must do. One is to PRINT CHARACTERS, and the other is to SWITCH its own modes of printing. To PRINT characters the printer must be able to receive and to respond rapidly to "streams of characters" sent by the computer. The characters are processed by a "printer driver", a machine language software that is supplied by the manufacturer of the "PRINTER INTERFACE". Since the TS-2068 contains only a printer driver for the little TS-2040 printer, ALL interfaces for large printers are supplied by our Cottage Industries. Some of these are "Serial Interfaces", but most are CENTRONICS PARALLEL interfaces.

We will delay the discussion of Serial (RS-232)

interfaces until the next issue of UP-DATE. For this discussion we will deal only with CENTRONICS PARALLEL interfaces, and only with the OLIGER and AERCO interfaces. These two "CPI" devices have become the dominant ones for the TS-2068, the most simple to use, and they use a minimal amount of computer memory for their printer driver code. In fact, the Disk Drive controller hardware contains the printer driver code in its EPROM, thus using no computer memory at all. These interfaces provide the electronics circuitry to process character streams and coded directions to a printer and to RECEIVE the "interrupt signals" from the printer.

The software "driver code" is an extension of the TS-2068 ROM, which lacks the "built in instructions" necessary to send data and commands to the printer. While the Olliger and Aerco CPI interfaces are different in circuitry, the driver codes supplied with each can be used with the other interface. Now lets get to the two functions of these CPI interfaces. One function, and the most complicated, is the processing of Character streams to the printer. Actually this is the most simple to use. <LPRINT> does it! You don't see the many complicated functions that take place, and you don't have to worry about it.

The other CPI function is to "Process Control Codes to the Printer", to make it do such things as Change from Elite Style to Pica Style, Roll up a Page, or the other mechanical functions that the printer does. The interface uses "OUT PORT 127" as the communications path to the printer, and the path back from the printer for "interrupts". So, the "ASCII COMMAND" that a printer needs to do a desired function is sent "OUT through PORT 127". A typical direct command to click up a line space is <OUT 127,10>. "10 decimal" is the industry standard ASCII CODE for printers to perform a LINE FEED. There are 32 "single character codes", 0 through 31, in the TS-2068 Character set that can be "sent out" in this manner.

Actually there are 255 character codes that can be sent out to the printer, but only 32 can be sent out "without a character being printed". All of the other 223 codes will cause something to be printed. Example, <OUT 127,65> will result in the character "A" being printed. This is because ASCII CODE 65 is assigned to the character "A", and the interface processes data characters to be printed. Some printers use as many as 80 ASCII CODES to perform internal changes. For example, a Diablo Daisy Wheel printer uses ASCII CODE 79 to "SET BOLD PRINT". BUT <OUT 127,79> PRINTS a "0"! The solution to "sending printable ASCII CODES" to the printer is to first send the "ESC COMMAND".

The "ESC" code is "27". So, using the above example, <OUT 127,27> then <OUT 127,65> will command



the Diablo printer to SET BOLD PRINT. The ESC code (27) tells the printer to "Expect a CONTROL CODE NEXT". Printer manuals vary as to how their CONTROL CODES are given. Most manuals have a table of control codes with numbers given in both HEXADECIMAL and DECIMAL. A typical such expression would be given in brackets as (18,4D)H (27,77)D. The first group is given in Hex and the second group in Decimal. In this case, our TS-2068 command would be <OUT 127,27> <OUT 127,77>. Another way that the SAME command group could be presented is <ESC M>. "ESC=27 and the Character Code of "M" is 77".

Still another way given in some printer manuals is <LPRINT CHR\$(27)+M>, which isn't the correct way of sending such codes with the TS-2068, but can be interpreted as OUT 127,27:OUT 127,77. So, with all of these different ways of saying the same thing, it's no wonder that printer manuals are confusing! Incidentally, that ONE command group is used by Epson printers to SET ELITE PRINT MODE. Command codes to perform a single function may be as many as six codes chained together. Example: (27,120,1)D (155,120,1)D. The "D" for Decimal may or may not be present. That command group SETS HI QUALITY MODE for Epson printers. The command for the Aerco and Oliger CPI would be <OUT 127,27: OUT 127,120: OUT 127,1: OUT 127,155: OUT 127,120: OUT 127,1>, quite a long group of OUTs to do just one switching function!

Now its gonna get longer, because that group of six OUT commands execute in about 100 milliseconds, and the printer requires much more time than that to respond to SWITCHING commands. For Software programming lines to Command the printer, we must have a "CHECK OF THE PRINTER STATUS" routine TO SEE IF THE PRINTER IS BUSY before sending a control code. When the printer is busy it places a interrupt signal on IN PORT 127. If the printer is busy then the software must wait until the printer is READY before sending the control code. The correct way to do this with the Oliger CPI is to use the loop given in the interface manual, which is <100 IF INKEY\$ #3="B" THEN GO TO 100> <102 RETURN>. Then a control code group such as (27,45) would be programmed in a line as: <50 GO SUB 100: OUT 127,27: GO SUB 100: OUT 127,45>. The line 100 will loop itself until the printer is READY, then the line 100 IF condition will be FALSE and the RETURN will allow the next OUT command to execute.

The above "INKEY\$ #3" polls the IN PORT 127 for the bits used by printers to signal its status to the computer. But, this procedure requires a interface driver that processes the INKEY #3 syntax. If you use another type of interface you should check its manual for a PRINTER STATUS CHECK routine. The use of INKEY\$ #5 returns a "Improper I/O device" report when used with some other interfaces. If you

get such a report code you can turn OFF the printer and type <PRINT IN 127>. Then use that number in the status check routine. My system produces 253 when the printer is BUSY. Mr. Oliger tells me that all bits of IN PORT 127 are not controlled the same with all models of the TS-2068. His words are quoted: "A program loop such as the example given (100 IF IN 127=253 THEN GO TO 100) (102 RETURN) should not be used and this is not how the printer interface manual instructs this to be done. This is the kind of thing that works with one computer but not on another, because all of the bits on IN PORT 127d are not used, and thus are floating. The function INKEY\$ #3 should be used for this purpose as detailed on page 6 of the Oliger Interface manual."

Pardon me for digressing into the complicated. This is supposed to be a SIMPLE treatise about how to clear the fog in printer manuals and CONTROL your printer with program lines. We will get back to that. Other interfaces such as TASMAN and A&J use LPRINT CHR\$ instead of OUT 127. Many printer manuals express their EXAMPLE commands in this manner, LPRINT CHR\$ 27, as the ESC command, instead of OUT 127,27. That's alright if you know how to interpret such red herrings. The Oliger and Aerco interfaces just wont work with LPRINT CHR\$, and must have OUT 127,number.

To sum up: When ESC is given, it means OUT 127,27. When a letter character is given as a command code, look up the ASCII code for the letter on page 239 of the TS-2068 User Manual and use the CODE number as the command. When constructing program lines to Command the Printer, each OUT 127 should be preceeded with <GO SUB> to the "STATUS CHECK" routine, which for the Oliger and Aerco CPI is <100 IF INKEY\$ #3="B" THEN GO TO 100> then a following line <102 RETURN>. The line numbers can be of your choosing. There is no limit as to the number of "chained commands" that can be in one program line. Many printers require as many as six chained commands to perform one function change of the printer.

You cannot use HEXIDECIMAL numbers in your OUT 127 command. HEX numbers must be converted to decimal, if not given in the printer manual. Page 239 of the TS-2068 User manual gives the codes in both Hex and Decimal. Printer control sequences given in a printer manual, such as: (ESC # 0 2) must be interpreted by looking up the codes for "\*" (42), for "0" (79), for "2", (50). We know that ESC is 27. So, the chained commands would be entered in a program line as follows: <500 GO SUB 100: OUT 127,42: GO SUB 100: OUT 127,79: GO SUB 100: OUT 127,50: RETURN >. GO SUB 100 would be to the INKEY\$ #3 routine to check the printer status.

Your printer and the software can both be OK,



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;Search the expansion banks in the SYSCON table. For the channel
; specifier (ASCII character) contained in C. If they match,
; return with CY=1, Z=0 & HL pointing to the bank # in the table
; This has no Spectrum counterpart
#####

1374 2ABCSC LD HL,(SYSCON)
1377 110C00 LD DE,#000C
137A 19 ADD HL,DE ;Skip the AR0S & LR0S parts

137B 7E L937B LD A,(HL)
137C FE90 CP #80
137E 281A JR Z,L939A ;If we're at end of table

1380 23 INC HL
1381 23 INC HL ;Point HL to specifier (ASCII char)
1382 FE01 CP #01
1384 2004 JR NZ,L938A ;If not a ROM bank

;Here for a ROM bank
1386 7E LD A,(HL) ;Get specifier
1387 B9 CP C ;Compare it against C
1388 2812 JR Z,L939C ;If they match

;Here if not a ROM bank
138A E5 L938A PUSH HL ;Present SYSCON 02
138B EB EX DE,HL
138C 111800 LD DE,#0018
138F 19 ADD HL,DE
1390 EB EX DE,HL ;DE is displacement into SYSCON table
1391 E1 POP HL ;Present SYSCON 02
1392 D5 PUSH DE
1393 111600 LD DE,#0016
1396 19 ADD HL,DE ;HL points to next SYSCON 00
1397 D1 POP DE ;DE is still displacement into SYSCON
1398 18E1 JR L937B ;Loop again

;Here for no match found at all
139A A7 L939A AND A
139B C9 RET

;Here for match found
139C 2B L939C DEC HL ;Point HL to bank # in SYSCON table
139D 37 SCF
139E C9 RET

;CLOSE# handler. Enter with stream # on calculator stack
; Similar to Spectrum at 16E5
139F CD0F14 CALL #140F ;Get stream displacement in BC, address
; of stream data in HL, & return here
; only if it's a legal one

13A2 78 LD A,B
13A3 B1 OR C
13A4 C8 RET Z ;If displacement is 0 (stream closed)

13A5 C0BE13 CALL #13BE ;Do the channel specific CLOSE function
13A8 010000 LD BC,#0000 ;Streams 04-0F will get 0000
13AB 11E2A3 LD DE,#ACE2
13AE EB EX DE,HL
13AF 19 ADD HL,DE
13B0 3807 JR C,L93B9 ;If stream is greater than 03

;For streams less than 04, get the original stream data
;Address of preprocessor routine
13B2 01CF11 LD BC,#11CF
13B5 09 ADD HL,BC
13B6 4E LD C,(HL)
13B7 23 INC HL
13B8 46 LD B,(HL)

;BC has the proper stream displacement. Install it
13B9 EB L93B9 EX DE,HL
13BA 71 LD (HL),C
13BB 23 INC HL
13BC 70 LD (HL),B
13BD C9 RET

##### ;Run the appropriate CLOSE routine
; Similar to Spectrum at 1701

13BE E5 PUSH HL ;Save address of stream displacement
13BF 78 LD A,B
13C0 FE80 CP #80
13C2 3014 JR NC,L93D8 ;If displacement is for an expansion
; bank, use the SYSCON table

;Here if not expansion bank
13C4 2A4F5C LD HL,(CHANS)
13C7 09 ADD HL,BC
13C8 23 INC HL
13C9 23 INC HL
13CA 23 INC HL ;Point to channel specifier (letter)
13CB 4E LD C,(HL) ;Get it
13CC EB EX DE,HL ;Save address
13CD 210714 LD HL,#1407 ;Address of lookup table
13D0 CD6B13 CALL #136B ;Scan the table
13D3 4E LD C,(HL) ;Get the displacement
13D4 0600 LD B,#00
13D6 09 ADD HL,BC ;Address of channel specific CLOSE
13D7 E9 JP (HL) ;Do it

;For expansion bank - stream displacement into SYSCON table
13D8 D680 L93D8 SUB #80
13DA 47 LD B,A ;Get rid of MSB
13DB 2ABCSC LD HL,(SYSCON)
13DE 09 ADD HL,BC ;Address of bank entry
13DF 7E LD A,(HL) ;SYSCON 00
13E0 FE00 CP #00
13E2 C8 RET Z ;If bank is inactive

13E3 FE80 CP #80
13E5 C8 RET Z ;If end of table

13E6 23 INC HL
13E7 46 LD B,(HL) ;Get bank #
13E8 23 INC HL
13E9 23 INC HL
13EA 23 INC HL
13EB 23 INC HL
13EC 5E LD E,(HL)
13ED 23 INC HL
13EE 56 LD D,(HL) ;DE=Address of CLOSE channel code
13EF 62 LD H,D
13F0 6B LD L,E ;Put it in HL
13F1 3ACB5C LD A,(STRMNM) ;Current Stream #
13F4 5F LD E,A
13F5 1600 LD D,#00
13F7 D5 PUSH DE ;Stream #
13F8 E5 PUSH HL ;Address of CLOSE code
13F9 C5 PUSH BC ;Bank #. BUG!!! has no horiz select!!!
13FA 010200 LD BC,#0002
13FD C5 PUSH BC ;2 bytes of output paraas
13FE 010000 LD BC,#0000
1401 C5 PUSH BC ;No input paraas
1402 CDD065 CALL #5D0 ;CALL_BANK
1405 E1 POP HL
1406 C9 RET

;Close stream displacement table. Points to channel specific code
; Seems rather silly, since all 3 channels point to the same spot
; Identical to Spectrum at 1716
1407 4B DEF9 *K,#05 ;Channel K, addr 140B
1409 53 DEF8 *S,#03 ;Channel S, addr 1409
140B 50 DEF9 *P,#01 ;Channel P, addr 140D

;Channel specific CLOSE for K, S, and P channels
; Identical to Spectrum at 171C
140D E1C9 POP HL
140E C9 RET

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;Get stream displacement in BC, Address of stream data in HL
; Similar to Spectrum at 171E
140F CD1E1F CALL #1F1E ;Get stream # from calculator stack
1412 32C85C LD (STRMM),A
1415 FE10 CP #10
1417 3802 JR C,L941B ;If stream # is legal (< #11)

1419 CF L9419 RST #
141A 17 DEFB #17 ;Error D - Invalid Stream

;Here for VALID stream. Finish up
141B C603 L941B ADD A,#03 ;Since first stream is -3
141D 07 RLCA
141E 21105C LD HL,STRMS ;STREAMS area
1421 4F LD C,A
1422 0600 LD B,#00
1424 09 ADD HL,BC ;Address of stream displacement
1425 4E LD C,(HL)
1426 23 INC HL
1427 46 LD B,(HL) ;Put displacement in BC
1428 2B DEC HL
1429 C9 RET

##### ;OPEN# handler. Note that this will pass a statement of the form
; OPEN# 2,"S", (any additional garbage) but only for the syntax
; check. Would have allowed an expanded OPEN# format
; Similar to Spectrum at 1736
142A FE2C CP #,
142C 2805 JR Z,L94B3

142E CD441B CALL #1B44 ;RETurn immediately if executing. Run
; an error if syntax checking & not end
1431 180B JR L943E

1433 CD892B L9433 CALL #2889 ;Check if we're interpreting
1436 2006 JR NZ,L943E ;If interpreting, not checking syntax

;Here if checking syntax
1438 CD6925 CALL #2569 ;Skip to end of statement
143B CD441B CALL #1B44 ;Error if not at end. We'll never
; RETurn from this

143E EF L943E RST #2B ;Run the floating point calculator
143F 01 DEFB #01 ;SWAP
1440 38 DEFB #38 ;END

1441 CD0F14 CALL #140F ;Get stream displacement
1444 7B LD A,B
1445 B1 OR C
1446 2816 JR Z,L945E ;If zero, the stream was closed

1448 EB EX DE,HL
1449 2A4F5C LD HL,(CHANS)
144C 09 ADD HL,BC
144D 23 INC HL
144E 23 INC HL
144F 23 INC HL ;Point to channel specifier
1450 7E LD A,(HL) ;Get it
1451 EB EX DE,HL
1452 FE4B CP #,
1454 280B JR Z,L945E

1456 FE53 CP #S,
1458 2804 JR Z,L945E

145A FE50 CP #P,
145C 20B8 JR NZ,L9419 ;If not K,S, or P, it's an error

145E CD6514 L945E CALL #1465 ;Get stream information
1461 73 LD (HL),E
1462 23 INC HL
1463 72 LD (HL),D ;Install it. Now stream is open
1464 C7 RET

;Get data to open the stream. Device spec is on the calculator
; stack. DE points into STRMS
; Similar to Spectrum at 175D
1465 E5 PUSH HL
1466 CDAF2F CALL #2F4F ;Get device spec from calculator stack
1469 0B DEC BC ;Length should go from 1 to 0
146A 78 LD A,B
146B B1 OR C
146C 2804 JR Z,L9472 ;If it really did

146E CF L946E RST #
146F 12 DEFB #12 ;Error J - Invalid I/O device

1470 CF RST #
1471 0E DEFB #0E ;Error F - Invalid file name

;Here for legal length
1472 03 L9472 INC BC ;Restore it to 1
1473 C5 PUSH BC
1474 1A LD A,(DE) ;Get the character
1475 E6DF AND #DF ;Convert to upper case
1477 4F LD C,A
1478 21C714 LD HL,#14C7 ;Address of lookup table
147B CD6813 CALL #136B ;Scan the table
147E 3006 JR NC,L9486 ;If no match

1480 4E LD C,(HL)
1481 0600 LD B,#00
1483 09 ADD HL,BC ;Compute proper address
1484 C1 POP BC
1485 E9 JP (HL) ;To get displacement to OPEN routine

##### ;This is a JR that was JRed to at 147E. This double jump appears
; to block off code due to a design change (or something they
; forgot to remove) to prevent entry to the code that follows.
; (The double jump was added by Tiaex - it is not in the Spectrum)
; If this JR is NOPed out, it will allow further OPEN routines to
; be searched for, in the SYSCON table.
1486 19E6 L9486 JR L946E

;If the above JR is NOPed, we will come here if we try to open
; a channel type that is different from the standard ones
; supported by the ROMs. Search the SYSCON table for it.
; Has no analogous Spectrum routine
#####

1488 CD7413 CALL #1374 ;Search the expansion banks
148B 30E1 JR NC,L946E ;If no match there either

;Here if there was a match
148D C1 POP BC ;Get length
148E 0B DEC BC
148F 78 LD A,B
1490 B1 OR C
1491 20DB JR NZ,L946E ;Error if length not 1

1493 D5 PUSH DE
1494 EB EX DE,HL
1495 CDB925 CALL #25B9 ;Put remaining parameters on stack, so
; the bank can pick them up

1498 EB EX DE,HL
1499 46 LD B,(HL) ;Get bank #
149A 0E88 LD C,#88 ;Select all chunks but those that may
; contain the RAM resident code

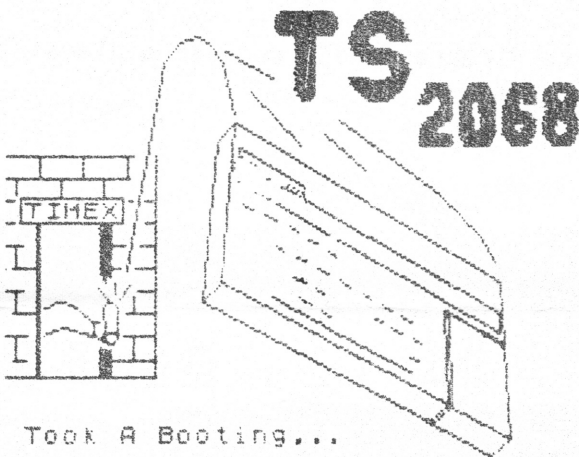
149C 23 INC HL
149D 23 INC HL ;Point to SYSCON 03
149E 5E LD E,(HL)
149F 23 INC HL
14A0 56 LD D,(HL) ;Get the OPEN channel code address
14A1 62 LD H,D
14A2 6B LD L,E ;Give it to HL
14A3 3ACB5C LD A,(STRMM)
14A6 5F LD E,A
14A7 1600 LD B,#000
14A9 D5 PUSH DE ;Stream # is an input parameter
14AA E5 PUSH HL ;OPEN channel address
14AB C5 PUSH BC ;Bank & Horiz select
14AC 2A655C LD HL,(STKEND)
14AF 4E LD C,(HL) ;Get # params
14B0 2B DEC HL
14B1 22655C LD (STKEND),HL ;Redo STKEND
14B4 0600 LD B,#000

```

## Printer Prog. Con't

but all you get is partial lines of print that lap over onto the next line, because of improper printer switch settings. Most softwares completely control the printer and require that no MARGINS be set at the printer, the auto PAGE ADVANCE be turned OFF, the printer LINE JUSTIFICATION be turned OFF, the PROPORTIONAL PRINT PRINT SPACING be turned OFF, and for letter size pages, the LINES PER PAGE setting at the printer should be 60 lines per page. Then the software and the printer wont be fighting each other to control margins, character spacing, and page length. Let the software do the controlling, and let the printer be DUMB, just responding to "Simon Sez" commands given by the software.

The printer switch that sets a LINE FEED with each CARRIAGE RETURN should be ON. Then a line feed will occur each time a line is printed. A Carriage Return command is sent by the software each time a line has printed, or the "partial last line" of a paragraph. Now this just about sums up "everything that anyone will ever need to know about Commanding printers with the Dillger and Aerco CP Interfaces". Next issue we will discuss a RS-232 Serial Interface. In the meantime perhaps someone would like to send in a treatise about "printer commanding with the TASMAN CPl. Permission is hereby given for TSUG Clubs to make re-prints of this article or excerpts thereof.



Took A Booting...

But Kept On Computing!

Artwork by Wes B.

Thanks:

TO: TS2068 UPDATE-THE USER'S  
NEWS FOR ALLOWING THE RE-  
PRINTING OF THE ARTICLE-  
"PRINTER PROGRAMMING"

TO: NAZIR PASHTOON, FOR ALL  
THE WORK SHARED WITH US.

## Spectrum/2068 Atlas Con't

TOKENS	0098	BASIC	0095
TO_THE	306C	FUNCTS	3851
TRUNC	35D3	SUMS	3214
TVFUL?	0790	IO_1	0C55
TV_COL	23BB	SYNTWG	2211
UPD_K	02E1	KSCAN	02BF
USRRET	3882	CALC	—
WRCH	0010	BASIC	0010
KEY	310D	INOUT	2D4F
X_CALC	134E	EDIT	16BF
X_T_HL	1363	EDIT	16D4

PROGRAM BLOCK -- 4000 BYTES  
ENTRY: 0000

## Nazir's Notes Con't

cess by identifying the various parts of a program, storage requirements, starting addresses, etc.

A final note concerning the EXROM disassembly for TS2068, and a comparison to Logan's Spectrum disassembly is in order. The Atlas shows that all cassette handling routines in the TS2068 are located in the EXROM. These routines depend on subroutines and RST's in the Home ROM. Thus whenever a RST or a call to the Home ROM is necessary, bank switching has to be performed. To achieve this, corresponding to every CALL or RST in the Spectrum cassette handling routines, there exists a 23 byte code segment in the TS2068 EXROM, which starts with a PUSH IX and terminates with POP IX. The purpose of the code is preserving, and setting up of some registers, as well as a call to a service routine at 0F99H in the EXROM. The service routine transfers the calls to the bank switching code in the RAM, which in turn completes the call to the Home ROM.

N.A. Pashtoon, Port Jefferson, NY



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RANDOM BITS-----The Greater Cleveland Sinclair Users Group, is sponsoring the 1988 Midwest Regional Timex-Sinclair-Amstead Conference on August 26 & 27 1988 near Cleveland Ohio, details available at next meet, or write Andy Kosiorek, Pres., 2192 Glenbury Ave, Lakewood, Ohio 44107 (or on Compuserve at ID# 75046,3420 or Cleveland Freenet BBS, 216-368-3888 ID#aa236 or Timelines BBS 216-671-6922 10p to 6a EST)

From member Harold Crandall, in response to Richard Hurd's request of last Sep/Oct issue.

	SPECTRUM	TS2068
RECLAIM_2	19E8	1750
MAKE_ROOM	1655	1288
TEMPS	0D4D	0888
NEXT_2NUM	1C79	1BDC
STK_TD_BC	2307	2660
CD_TEMP_3	21F2	239C
EXPT_STRING	1C8C	18EF
EXPT_2NUM	1C7A	1BDD

From the Northwest comes another August event, the 3rd Annual International Great NW TS Mini-Fair, 6 & 7 August 1988 in Portland OR. Contact Rod Gowen, 1419 1/2 7th Street, Oregon City, OR 97045 (503) 655-7484 Lots planned, speakers, exhibits and user group tables.

Perhaps one of the best functions of a nationwide user organization would be that of a vendor clearing house- if anyone was in doubt of a vendor's current status, or heard one was closed, the story could be checked out BEFORE passing it on.

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Thanks to Wes Brzozowski, Don Lamen, and John Colonna for their help with this issue, and thanks to Joan Kealy for the program, they will be part of the next swap tape/disc. Till next issue keep those cards and letters coming and stay healthy!